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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Group:	1762
Confirmation No.:	9358
Application No.:	09/742,625
Invention:	**In-Press Process For Coating Composite Substrates**
Applicant:	Frank Bor-Her Chen, et al.
Filed:	December 20, 2000
Attorney Docket:	25164-67462
Examiner:	Rebecca A. Blanton

Certificate Under 37 C.F.R. 1.8

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on February 28, 2002

Garla L Twyman
(Signature)

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RESPONSE UNDER 37 C.F.R. § 1.1

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

This is in response to the Official Action mailed November 30, 2001 on the captioned patent application. The claims in the application are claims 37-48, all of which stand rejected under 35 U.S.C. § 103(a) as unpatentable over Mirous et al., U.S. Patent No. 5,716,239 in view of Argyropoulos et al., U.S. Patent No. 5,412,049.

The rejected claims are directed to a process for the manufacture of polymer coated composite substrates. The process comprises the steps of forming a chemically crosslinked polymer coating on a compressible mat without heating and thereafter compressing and heating the crosslinked coating and the mat to form the polymer coated composite substrate. In one embodiment the polymer coating is formulated to become ionically crosslinked as the

coating mixture is applied before heating and compression of the compressible mat. The formation of a crosslinked coating prior to application of heat/compression works to prevent the coating mixture from being drawn, under the influence of capillary action, into the porous substrate during the heating/compression step. It thus provides for the production of coated composite substrates having more uniform, aesthetically pleasing coatings directly out of the press. Accordingly, it is an important aspect of the presently claimed invention that the polymer coating applied to the mat is chemically crosslinked either by ionic or covalent bonds prior to the step of compressing and heating the crosslinked coating and the mat to form a polymer coated composite substrate.

The primary reference, Mirous et al., teaches a process for forming a coated cellulosic panel wherein the coating is formulated to exhibit flexible thermoplastic properties upon reheating to allow for embossing operations with little or no embossing plate build-up. The critical topspray coating composition described by Mirous et al. contains both a thermoset resin and thermoplastic resin in quantities sufficient to exhibit a softening temperature within a range of about 130° to about 300°C. "The curing temperature is preferably above the melting point of the thermoplastic polymer to effect bonding. Preferred temperatures are in excess of 130°C, and preferably between the range from about 150°C to about 200°C." [Column 9, lines 31-34 and 58-61] As acknowledged by the Examiner the primary reference does not teach that the topcoat polymer composition is chemically crosslinked without heating before heating and compressing the compressible mat. Indeed, the prior art topcoat composition is formulated to cure at temperatures in excess of 130°C and preferably within the range of about 150 to about 200°C.

In support of the rejection of claims 37-48 the Examiner combines the teachings of Mirous et al. with those of Argyropoulos et al. U.S. Patent No. 5,412,049. The Examiner points out that Argyropoulos et al. teach a coating composition that may be used for pressboard items, that acrylic compositions may be cured by photochemical means, and that radiation curable systems are particularly useful when curing coatings on paper. The Examiner contends that it would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute a thermosetting curable resin of Mirous et al. with the thermosetting curable resin taught by Argyropoulos with the expectation of similar results.

Respectfully, the Argyropoulos reference does not bridge the gap between the teaching of the primary Mirous et al. reference and the invention specified by the present claims.

Again, the present invention is directed to a process for the manufacture of a polymer coated composite substrate comprising the steps of forming a chemically crosslinked polymer coating on a compressible mat without heating and thereafter compressing and heating the crosslinked coating on the mat to form the polymer coated substrate. The chemically crosslinked polymer can either be crosslinked by ionic or covalent bonds. While the Argyropoulos reference does teach coatings curable by other than application of heat and that such coatings can be used for pressboard items, respectfully such does not reasonably suggest the presently claimed invention which requires the compressing and heating of a compressible mat having a coating already crosslinked prior to the heating and compressing step. Neither of the cited references, alone or in combination as applied by the Examiner, suggest forming a crosslinked coating on a compressible mat and thereafter compressing and heating the crosslinked coating and the mat to form a polymer coated composite substrate. The reference to pressboard items in the Argyropoulos is merely exemplary of the types of substrates that can be coated with the composition described on that reference. The reference does not teach or suggest the process for preparation of coated compressed composite substrates as specified in accordance with the present claims wherein a coating composition is applied to form a crosslinked coating on a compressible mat and wherein the crosslinked coating and the compressible mat are thereafter compressed and heated to form a coated composite substrate.

With reference to claims 41, 43, and 48 the Examiner points to the teaching at Column 8, lines 33-52 of the Argyropoulos reference indicating a teaching that the thermoset resin may be ionically crosslinked. Respectfully, that text does not refer to resins having ionic crosslinks, but instead refers to an ionic mechanism ("cationic-initiated coating systems" or "cationic-cure photo-cure systems") for forming covalent crosslink curing. [See the continuation of that text at Column 8, lines 53-69 and the patent and literature references cited therein.]

With reference to claim 42 the Examiner points to the teaching at Column 5, lines 34-48 of the Argyropoulos reference that polymers may be covalently crosslinked polymers. Again, there is no teaching or suggestion in either the primary or secondary reference of forming a chemically crosslinked polymer on the compressible mat and thereafter compressing and heating the crosslinked coating and the mat to form a polymer coated composite substrate as required by the present claims.

With reference to independent claim 44 the Examiner points out that the Mirous et al. reference teaches a coated composite substrate that is compressed and heated to form a

polymer coated composite and that the Argyropoulos et al. reference teaches a pressboard coating that is cured through photochemical means and is ionically crosslinked. As detailed in Applicants' remarks above, the primary Mirous et al. reference does not describe or suggest the requirement of Applicants' claims that the coating applied to the compressible mat be crosslinked before the mat is compressed and heated to form the polymer coated composite. Nor is there any suggestion of that critical element of Applicants' claims in the Argyropoulos et al. reference. Claim 44 specifically requires the steps of forming an ionically crosslinked polymer on the compressible mat and compressing and heating the (ionically) crosslinked coating and the mat to form a polymer coated composite substrate. Neither of the cited references describe or suggest that process. The differences between Applicants' claimed invention and the cited art are such that Applicants' invention as a whole would not have been obvious to one of ordinary skill in the art at the time the invention was made.

Finally, with reference to claims 45-47, the Examiner notes that the Mirous et al. reference teaches that the mat may include a sheet of paper glued to the surface of the mat where the paper is coated with a crosslinked polymer. Again, Applicants' respectfully point out that claims 45-47 depend from claim 44 which requires the formation of an "ionically crosslinked coating" and thereafter compressing and heating the ionically crosslinked coating with the compressible mat to form the polymer coated substrate. Neither of the cited references, alone or in combination, teach or suggest that required element of claims 45-47. Respectfully, those claims cannot reasonably be said to be obvious within the meaning of 35 U.S.C. § 103 over the cited art references. The claimed invention is believed to be patentable over the cited art. Reconsideration of the claims in view of the foregoing remarks leading to withdrawal of the rejection and passage of the application to issuance is requested.

Respectfully submitted,

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